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FERTILITY RELATIONS IN THE *PEROMYSCUS LEUCOPUS* GROUP OF MICE

BY LEE R. DICE

THE following report deals with the fertility relations shown by laboratory matings between the various subspecies and species of the *Peromyscus leucopus* group of mice.

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Two species, *Peromyscus leucopus* and *P. gossypinus,* make up the *leucopus* group, which forms part of the subgenus Peromyscus (Osgood, 1909: 29). The species *leucopus,* including the white-footed mice, is divided by Osgood into thirteen subspecies, ranging from Nova Scotia to southern Mexico. The species *gossypinus,* including the cotton mice, is divided into three subspecies, ranging from Texas to Florida and to southern Virginia.

The ranges of *leucopus* and of *gossypinus* overlap slightly, and at a few places the two species occur together, but Osgood (1909: 137) did not find evidence of intergradation. More recently Howell (1921: 50) at several places in northern Alabama found occasional specimens intermediate in characters between *leucopus* and *gossypinus,* and these he believed to be hybrids between the two species.

Most of the mice of the *leucopus* group which I have had in the laboratory have proved relatively fertile when mated with other mice taken at the same locality. Some individuals, however, both males and females, have been persistently infertile. Some of the infertility is due to the fact that certain mice are old when captured. The disturbance of being placed in the laboratory under restraint very likely has an adverse effect on the breeding of some individuals. Also, our laboratory probably does not provide optimum breeding conditions for all these forms, which come from several diverse types of climatic environments.

There is more infertility in some stocks of these mice than in others. In some only one or two pairs of the field-caught animals have proved fertile, while in other stocks nearly every individual seems capable of breeding. In no stock have all the field-caught mice been infertile. Generally the cage-bred mice are more likely to be fertile than are the field-caught mice.

Stocks of mice of the same subspecies taken in widely separated parts of its geographic range seem to be fully fertile together. One of the most widely distributed subspecies of this group is *Peromyscus leucopus noveboracensis,* whose range, according to Osgood (1909: 114, Fig. 2), extends from Kansas to North Carolina and from South Dakota to Nova Scotia. Stocks of *noveboracensis* from Manhattan, Kansas, and from Cambridge, Maryland, mated together produced offspring, and both the female and male hybrids proved to be fertile, producing the second generation. No attempt was made to secure the F_2 generation in any other cross within the subspecies, but F_1 hybrids were secured in crosses between stocks of *noveboracensis* from Manhattan, Kansas, and from Greenland, New Hampshire; and between stocks from Byron, Michigan, and from Sawyer, Wisconsin. In the subspecies *P. l. texanus* F_1 hybrids were secured in a cross between stocks from Denton, Texas, and from El Mulato, Tamaulipas. No attempt was made to determine the fertility of these F_1 hybrids.

Furthermore, all the subspecies of *leucopus* seem to be completely interfertile in the laboratory, and both the female and male F_1 hybrids have proved fertile, producing the F_2 generation. The F_2 hybrid generation has been thus produced in the following subspecific crosses:

aridulus, Hackberry Lake, Neb. × *leucopus,* Zuni, Va.
arizonae, Hereford, Ariz. × *texanus,* El Mulato, Tamaulipas
fusus, Vineyard Haven, Mass. × *noveboracensis,* Greenland, N. H.
noveboracensis, Manhattan, Kan. × *texanus,* El Mulato, Tamaulipas
texanus, Denton, Texas × *tornillo,* Post, Texas

Likewise, two subspecies of the cotton mouse, *gossypinus,* from Gainesville, Florida, and *palmarius,* from Sebring, Florida, have proved interfertile, and their hybrid offspring were fertile, producing the F_2 hybrid generation.

Nor is there any indication of infertility between the members of the species *leucopus* and *gossypinus.* Second generation hybrids have been secured in the following inter-specific crosses:

aridulus, Hackberry Lake, Neb. × *gossypinus,* Gainesville, Fla.
aridulus, Hackberry Lake, Neb. × *gossypinus,* Cypress Chapel, Va.
arizonae, Hereford, Ariz. × *gossypinus,* Gainesville, Fla.
noveboracensis, Dennisport, N. H. × *palmarius,* Sebring, Fla.

In the Dismal Swamp area of Virginia I collected in 1933 a number of mice of this group, part of them obviously *leucopus*, others certainly *gossypinus*, and still others of somewhat doubtful identity. A detailed description of these mice will be published later. All the various strains from the area proved to be completely interfertile in the laboratory, producing fertile offspring.

The sex ratio of the inter-specific hybrids between *leucopus* and *gossypinus* does not differ significantly from normal, although the female hybrids outnumber the males in most, but not in all of the crosses. In a cross between *aridulus* from Hackberry Lake, near Valentine, Nebraska, and *gossypinus* from Cypress Chapel, Virginia, seven female and five male hybrids were produced. On the contrary, in a cross of *aridulus* from Hackberry Lake with *gossypinus* from Gainesville, Florida, there were produced only thirteen females to fourteen males. In a cross between *P. leucopus arizonae* from Hereford, Arizona, and *gossypinus* from Gainesville, Florida, there were produced fifteen females to nine males. In a cross between *P. leucopus noveboracensis* from Dennisport, New Hampshire, and *P. gossypinus palmarius* from Sebring, Florida, there were produced four female and three male hybrids. The sum of the hybrid offspring from these several inter-specific crosses amounts to thirty-nine females and thirty-one males. If we assume that in ordinary matings in these mice equal numbers of each sex should be expected, then the standard error of random sampling for the number of hybrids obtained is ± 4.18. The female hybrids are clearly a considerable majority, the sex ratio being 79.5. The deviation, however, of the sexes of the hybrids from the expected numbers of 35 ♀ : 35 ♂ is not significant, being less than once the standard error.

Although only a few of the possible crosses between the numerous subspecies of the *leucopus* group have been made in the laboratory, and although the fertility relationships of some subspecies have not been tested at all, yet the high degree of fertility shown by all the crosses which have been attempted seems to indicate the presence of complete interfertility between the two species and all the subspecies making up the *Peromyscus leucopus* group of mice.

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